

What is claimed is:

1. A method for producing a transgenic *Caenorhabditis elegans* (*C. elegans*) that expresses at least one human 7TMR pan-neuronally, such that said transgenic *C. elegans* exhibits a known phenotype, said method comprising the steps of:

- 5 (a) producing a transgene by operably linking a gene expression construct that encodes a human 7TMR to a pan-neuronal promoter; and
- (b) introducing said transgene into said transgenic *C. elegans*, such that said transgenic *C. elegans* expresses said human 7TMR pan-neuronally; and
- (c) examining said transgenic *C. elegans* to determine whether said transgenic *C.*
10 *elegans* exhibits a known phenotype.

2. The method as claimed in Claim 1, wherein the known phenotype is selected from the group consisting of: exploded (Exp), dumpy (Dpy), long body (Lon), hyperactive movement (Hpr), paralyzed (Prl), molt defect (Mlt), sterile (Ste), sick (Sck), body morphology defect (Bmd), vulvaless (Vul), slow growth (Gro), egg laying defect (Egl),
15 larval arrest (Lva), larval lethal (Let), protruding vulva (Pvl), multiple vulva (Muv), sterile progeny (Stp), small (Sma), clear (Clr), blistered (Bli), high incidence of male progeny (Him), roller (Rol), larval lethal (Lvl), uncoordinated (Unc), embryonic lethal (Emb).

3. A transgenic *C. elegans* produced by the method of Claim 1.

20 4. A method for producing a transgenic *C. elegans* that expresses a human seven transmembrane receptor (7TMR) in the sensory neurons that correlate with behavior, said method comprising the steps of:

- (a) producing a transgene by operably linking a gene expression construct that encodes a human 7TMR to a sensory neuron promoter; and
- 25 (b) introducing said transgene into said *C. elegans*, such that said *C. elegans* expresses said human 7TMR in its sensory neurons that correlate with behavior.

5. A method for producing a transgenic *C. elegans* that expresses a human 7TMR in the sensory neurons that correlate with behavior, said method comprising the steps of:

(a) producing a first transgene by operably linking a gene expression construct that encodes a human 7TMR to a sensory neuron promotor;

(b) producing a second transgene by comprising an accessory protein operably linked to a promotor; and

- 5 (c) introducing said first and second transgenes into said *C. elegans*, such that said *C. elegans* coexpresses both said accessory protein and said human 7TMR in the sensory neurons that correlate with behavior.

6. A method for identifying at least one ligand of at least one human 7TMR, said method comprising the steps of:

- 10 (a) providing at least one *C. elegans* that expresses at least one human 7TMR in the sensory neurons that correlate with behavior;

(b) contacting said at least one *C. elegans* with at least two different concentrations of at least one test substance; and

- 15 (c) detecting modulation of behavior of said at least one *C. elegans* in response to said at least one test substance.

7. A method for identifying at least one ligand of at least one human 7TMRs, said method comprising the steps of:

(a) providing at least one *C. elegans* that expresses at least one human 7TMR in the sensory neurons that correlate with water-soluble chemorepulsive behavior;

- 20 (b) placing a medium into a first portion of a receptacle, wherein said receptacle is divided into at least two portions;

(c) adding at least two different concentrations of at least one chemorepulsant substance to the first portion of said receptacle;

(d) adding said at least one *C. elegans* to the second portion of said receptacle; and

- 25 (e) detecting, after a suitable time period, the behavioral response of said at least one *C. elegans* to said at least one chemorepulsant substance.

8. A method for identifying at least one ligand of at least one human 7TMR, said method comprising the steps of:

(a) providing at least one *C. elegans* that expresses at least one human 7TMR in the sensory neurons that mediate water-soluble chemoattractive behavior;

5 (b) placing a medium into a first portion of a receptacle, wherein said receptacle is divided into at least two portions;

(c) adding at least two different concentrations of at least one chemoattractant substance to the first portion of said receptacle;

(d) adding said at least one *C. elegans* to the second portion of said receptacle; and

10 (e) detecting, after a suitable time period, the behavioral response of said at least one *C. elegans* to said at least one chemoattractant substance.

9. A method for identifying at least one ligand of a human 7TMR said method comprising the steps of:

15 (a) providing at least one *C. elegans* that expresses a human 7TMR in the sensory neurons that correlate with behavior;

(b) placing at least two different concentrations of at least one test substance on a substrate surface that contains growth medium;

(c) placing a uniform lawn of bacteria on the surface of said growth medium;

(d) contacting said at least one *C. elegans* with said uniform lawn of bacteria; and

20 (e) detecting, after a suitable time period, a decrease in the density of said uniform lawn of bacteria.

10. A method for identifying at least one ligand of at least one human 7TMR, said method comprising the steps of:

25 (a) providing at least one *C. elegans* that expresses a human 7TMR in the sensory neurons that correlate with behavior;

- (b) placing a medium in a receptacle;
 - (c) placing at least two different concentrations of at least one test substance on said medium;
 - (d) adding said at least one *C. elegans* to said receptacle; and
- 5 (e) detecting, after a suitable time period, the behavioral response of said at least one *C. elegans* over the surface of said medium.

11. A method for evaluating the potency of human 7TMR activation by a known ligand, said method comprising the steps of:

- (a) providing at least *C. elegans* that expresses at least one human 7TMR in the sensory neurons that correlate with behavior, wherein said at least one human 7TMR has a known ligand;
- 10 (b) contacting said at least one *C. elegans* with said ligand and at least one structurally related compound; and
- (c) detecting the behavioral response of said at least one *C. elegans* to said at least
- 15 one structurally related compound; and
- (d) comparing the behavioral response of said at least one *C. elegans* to said ligand to the behavioral response of said at least one *C. elegans* to said at least one structurally related compound.

12. A method for identifying at least one test substance that is an antagonist of a

20 human 7TMR, said method comprising the steps of:

- (a) providing at least one transgenic *C. elegans* that expresses a human 7TMR pan-neuronally, wherein said human 7TMR is activated by an endogenous ligand, such that said transgenic *C. elegans* exhibits a known phenotype;
- (b) contacting said at least one transgenic *C. elegans* with at least one test
- 25 substance, wherein said at least one test substance is distributed in a medium;

(c) determining whether said at least one test substance causes a suppression of said known phenotype in said at least one transgenic *C. elegans*; and

(d) identifying said at least one test substance that causes a suppression of said known phenotype in said at least one transgenic *C. elegans* as an antagonist of said human
5 7TMR.

13. A method for identifying a surrogate ligand present in a strain of transgenic *C. elegans* that expresses a human 7TMR pan-neuronally, wherein said strain of transgenic *C. elegans* exhibits a known phenotype, such that said human 7TMR is activated by an endogenous ligand, said method comprising the steps of:

10 (a) providing a strain of human 7TMR-expressing transgenic *C. elegans*, wherein said strain of transgenic *C. elegans* exhibits a known phenotype;

(b) subjecting said strain of transgenic *C. elegans* to at least one mutagenic screen;
and

(c) determining whether said at least one mutagenic screen results in a suppression of
15 said known phenotype in said strain of transgenic *C. elegans*.

14. A method for identifying at least one substance that agonize the activity of a human 7TMR, said method comprising the steps of:

(a) providing at least one transgenic *C. elegans* that expresses a human 7TMR pan-neuronally, wherein said at least one transgenic *C. elegans* does not exhibit a known
20 phenotype because said human 7TMR is not activated by an endogenous ligand;

(b) contacting said at least one transgenic *C. elegans* with at least one test substance, wherein said at least one test substance is distributed in a medium;

(c) determining whether said at least one test substance causes said at least one said transgenic *C. elegans* to exhibit a known phenotype; and

25 (d) identifying said at least one test substance that causes said at least one said transgenic *C. elegans* to exhibit a known phenotype as an agonist of said human 7TMR.